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ABSTRACT

Noting that obesity among children is a major public health concern, this study sought to determine the relationship between the weight of mothers and weight of their offspring. Based on the literature review, the correlation between weight of mother and weight of offspring appears to be inconclusive. The subjects studied were 62 mothers and one of their children (ages 3-5) who had participated in the Women, Infants, Children Supplemental Food Program (WIC). Data were obtained from the subjects' clinic records. The findings were tabulated in terms of means and correlation of all variables: mother's weight, height, and age at time of delivery, and the child's weight and height. The results indicated that there was a significantly positive, but low correlation between the weight of mother and weight of the offspring. A significant negative correlation was found between the mother's age upon delivery and weight of the offspring. Also, a significant positive correlation was found between the height and weight of a child. The results suggest that families that tend to be obese should monitor their diets. Several recommendations for health care were gleaned from the results, including the following: (1) genealogical medical history should be documented for both parents; (2) the relationship of family income and social class to childhood obesity should be studied; (3) attitudes of mothers and children toward obesity should be monitored; and (4) early intervention programs for childhood obesity should be implemented and monitored. (Contains a 34-item bibliography.) (WP)

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THE CORRELATION BETWEEN WEIGHT OF MOTHER AND THE WEIGHT OF OFFSPRING

Anna Lovelace Ware

Obesity among children is a major concern among public health professionals in obese by current medical standards (AJCN,1956). There are 50 million Americans under the age of eighteen. That means there are some 12.5 million obese children in this country. The topic of childhood obesity holds interest for health care professionals as well as the general public. Previous studies have shown in childhood, excess bodyweight relative to height (ponderosity) is associated with increase blood pressure and decreased high density lipoprotein cholesterol levels. The information from this study will assist in decreasing the high incidence of obesity among high risk population. Although the causes of obesity have not been conclusively determined, it was hypothesized in a thesis by the Department of Human Development at Michigan State University that it is a result of overeating and the lack of physical activity. According to Blackburn (1990), heredity and the environment are the two major factors causes of obesity. Demographic data such as social class, race and family has been used in correlational analyses to determine if these variables have an influence on obesity in children. However, the foregoing factors have not been found to be highly predictive in determine which children from which families will be obese (LeBow, 1983). A study published in the American Journal of Disease Chronicles (1991) found maternal obesity and high birth weight were highly associated with child obesity. The investigation associated risk factors with obesity among native Americans pre-school children. The findings from previous studies also identified risk factors for obesity among predominantly white and black pre-schooled children. These included familial obesity, socioeconomic status, and family size. It was recommended that intervention for obesity screening should be done as early as two years of age to avoid the long terms consequences of obesity as a lifetime problem.

Early and continuing health care serves are integral role in identifying obesity. It seems logical to target pre-school children since they have frequent contact with medical centers, immunizations clinics, and public health services. The risk for future obesity can be monitored in pre-school children by simply obtaining their height and weight measurements. Height and weight are anthropometric measurements used for two major roles to assess the nutritional and health status of children and to evaluate the growth of individuals in comparison with a reference population.

Anthropometric results for height and weight are most frequently analyzed according to a reference population in relation to age and sex, using a normalized growth reference curves as the criteria for comparison of normal child growth. In terms of medical records, heights and weights of children between the ages of one and five are routinely taken once or twice a year for immunization or medical follow-ups. The availability of these data are highly assessable.

There has been disagreements among researchers regarding the varying criteria used to determine obesity status. Among researchers who have investigated obesity in pre-school children, Gallaher et. al. (1991) reported that the criterion of weight and height (W/H) as measures of obesity was chosen because it is the most practical and widely used data and can be retrieved from current medical records. It has been reported that obesity

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can only be approximated by anthropometric measurements. Weight for height cannot indicate whether increased weight is due to adiposity, increased muscularity, or edema. Obesity for children was defined as W/H above the 90th percentile. Obesity for mothers was defined as women who weigh more than 20-25% over or above their ideal body weight.

The assessment for children nutritional and health status should be done by a trained health care professional. Parents quite frequently compare their children's weight and height with their friends children. It is imperative that assessment for obesity be done by a pediatrician, nurse or dietitian. If a child is overweight the key to a successive intervention strategy involves primarily assessment of parent's attitudes and perceptions of the child's weight. Studies have indicated that in certain cultures mothers of obese children preferred a fatter baby, were "pushier feeders," and were more likely to be obese themselves. Cultural and familial influences are environmental factors that play a major role in the intervention outcome. It has been documented that for 70 percent of overweight children, the problem can be attributed directly to the above environmental causes. For the other 30 percent, heredity appears to be the cause (Blackburn, 1990).

The most effective weight-control program will require change not only for the obese child, but for the entire family. This intervention strategy should be comprehensive in its approach to promote an increase in physical activity, positive family support and flexible low-fat eating plan in which emphasize portion size and between meal snacking are kept to a moderate levels. The most successful formal programs are inclusive in which family members focus on appropriate behavior and healthy foods, not on dieting and calorie counting alone.

Previous studies have indicated that obese children may be more likely to become obese adults and are at additional risk of morbidity. Adults who experience obesity problems are very resistant towards intervention (Gallaher et. al. 1991). A study, by Ginsberg-Fellner et. al. (1981) found that childhood obesity is recognized as a very important nutritional disorder that could predispose children to obesity, related chronic illness such as hypertension, heart disease and non-insulin dependent diabetes mellitus. The prevalence of obesity is estimated at approximately 25% for adults over 30 and more than 10% for adolescents. Also, Ginsberg-Fellner reported that once the number of adipocytes (fat cells) in a child over six years of age reaches normal adult level, long term maintenance of and reduction of obesity is usually unsuccessful. The consequences of ignoring early signs of obesity are very costly in terms of both mortality rates and morbidity. On the other hand, the correlation between weight of mother and weight of offspring appears to be inconclusive. Therefore, there is a need for additional research. The findings would be of significant value to nutritionists, other health care professionals and parents. Therefore, the purpose of this study is to determine the correlation between weight of mother and the weight of one offspring.

Procedures

The population/sample included 62 mothers and one of their children (ages 3-5). The majority of the women were from low socio-economic backgrounds and participated in the "Women, Infants, Children Supplemental Food Program "(WIC), and whose children's height and weight had been documented. The WIC program is a food supplemental program. The subjects of this population were comprise of 80% non-whites. The data were

obtained from the clinics' master records of the sample, which included mother's and child's health histories, growth charts and biochemical laboratory data, such as hemoglobin or hematocrit.

The findings were be tabulated in terms of means and standard deviations. The Pearson Product Moment Correlation Coefficient will be employed at the .05 level of confidence to determine the statistical significance of the correlation between mother and offspring weight and related variables. The researcher hypothesized that there will not be a relationship between parental weight the weight of an offspring.

Results

Table I summarizes the correlation between all variables and the child's weight and height.

TABLE I

SUMMARY OF CORRELATION COEFFICIENT

Correlation	Mean of X	Mean of Y	Weight of Child	Height of Child
Weight of mother	29.50	36.35	0.32*	
Mom's age at delivery	158.79	36.35	−0.24	
Weight of child	38.94	36.35		0.61*
Height of Mother	64.02	38.90		0.13*

* Statistically significant at .05 level.

Summary

The purpose of this study was to determine the relationship between the weight of mothers and weight of offsprings. The subjects studied were mothers who had participated in the WIC Nutrition Program in the South suburbs of Chicago. It was hypothesized that there would not be a significant correlation between parental weight of mother and weight of offspring. The results indicated that there was a significant (0.32) positive, but low correlation between the weight of mother and weight of the offspring. The null hypothesis was rejected. A negative significant (−0.24) correlation was found between the mother's age upon delivery and weight of the offspring. Also, a significant (0.61) positive correlation was found between the height of child and weight of the offspring. The findings also showed a low insignificant (0.13) positive correlation between the height of mother and the height of child.

The findings of a low positive correlation between the weight of mother and the weight of an offspring does not concur with the studies cited on genetics or family-line obesity in the review of literature.
The reviewed research reports inconclusive findings in regards to obesity following familial-lines. Gallaher,et. al. (1991), who investigated 261 native American pre-school children found that children with obese mothers were more than twice as likely to be obese than children of non-obese mothers. Replicating the Gallaher's study Stunkard, et. al. (1986) found that genetic factors and the family environment contributed to the obesity of adult Danish adoptees. He reported that the mothers' weight class correlated highly with the obesity of their offspring as compared to correlation with weight class. On the other hand, some researchers disagreed on which parent's weight class had the most influence on childhood obesity. A cross sectional survey was done on 40,000 persons to investigate family histories. The Ten State Nutrition Study (TSNS) data strongly indicated that lean parent tended to have leaner youngsters. Obese parents tended to have fat children. Even if only one parent is corpulent it mattered little which parent influenced the child's corpulence (Garn and Clark, 1976). But another study disagreed that obesity in children is a function of strong family line connections; 2044 Italian families were investigated for familial linkages with childhood obesity by assessing their height, weight and skinfold thickness. The results showed that familial linkages with childhood obesity was weak (Sgaramella et.al.,1980).

A survey on the degree of obesity between parents and children. Little similarity in obesity was found. It was noted, however, that the obesity information on excessive weight to height of mothers and fathers may have been inaccurate. The parents of obese children may not, at the time they were measured, have been overweight (Keller et.al. 1978). Considerable evidence showed that genetic-oriented factors contributed to less childhood obesity, than dietary habits. Studies by the National Institute of Child Health and Human Development agreed that obesity is prevalent in the family, but did not accept the proposition that obesity was hereditary. The Institute found that obese parents have obese children. Their adoptive children In addition, and pets will also be obese. The findings strongly suggested that family dietary and activity habits correlated with obesity (Wilkinson,1980).

It has been well documented that a strong relationship exists between a mother's pregnancy weight and the infant's weight at birth. In a investigation of 2000 pregnant women, three major variables were examined: 1) the weight of mother, 2) labor complications, and 3) birth weight. The results showed that significantly more overweight mothers gave birth to heavier babies than non-obese mothers (Gross, et. al., 1980). There is a negligible amount of research reported on the association between high birth weight and childhood obesity. A study by Fisch et. al. (1975) assessed the effects of children being overweight at birth and their weight later in life by dividing weight by height. The authors followed the development of 1786 overweight babies and attempted to predict their relative weights at age four to seven years of age. It was found that some overweight newborns remained overweight. Many overweight newborns did not. Moreover, the researchers concluded overweightness in childhood did not necessarily reflect the presence of overweightness at birth. More than a few of the overweight 4-year old in their study had no history of being overweight at birth.

The correlated results in this study were negative on the analysis of mother's age upon delivery and weight of the offspring. The correlation was

very low. The findings of this study reinforce research presented in the review of literature. In a study of 261 native American pre-school children were investigated to determine the prevalence of obesity and associated risk factors. The results indicated no association between the mother's age the time of the child's birth and its weight (Gallaher et. al. 1991).

The results of this study found a strong relationship (r=0.61) between height of the child and weight of the child. Height and weight anthropometric measurements are commonly used as criteria in evaluating the growth of a child. Therefore, the taller a child appears the leaner his weight seems and vice versus. It has been well documented that in some child populations, low height for age is paradoxically accompanied by increased weight for height, suggesting obesity. A recent study on body composition of Peruvian children with short stature and high weight for height indicated that the high weight for height in these children is not obesity but is associated with lower body fat and greater lean tissue or lean tissue hydration, which may reflect dietary, environmental, or genetic influences (Trowbidge, et. al. 1987). In another study on obesity in low-income Hmong children, an ethnic group considered to have low height for age, found evidence of early obesity. It is unclear if the excess weight for height represents excess adiposity and not additional lean tissue (Himes et. al, 1991).

The last variable analyzed was the height of the mother and the height of the child. There has been little research on the relationship between parent's height and child's height. Recent studies has reported that the principal cause of growth stunting in the developing world are nutritional inadequacies, complicated by a high prevalence of infectious diseases (Trowbridge, et. al. 1987). Previous studies done at the WIC program found that those who remain in WIC are at a higher risk of poor health outcomes such as low height for age and anemia. Research has indicated that growth patterns are influenced by genetics, nutritional or socio-economic conditions (Himes et. al. 1992).

Implications

The results of this study suggest that a relationship exists between parental weight and the weight of the offspring. Although the correlation was low (0.32) it suggests that families that tend to be obese should monitor their diets. This study was based on WIC data which may have been to some inaccurate. In regards to the mother's weight, it was based upon the last recorded pre-pregnancy weight. The several variables that could have influenced the last recorded pre-pregnancy weight could be: 1) mother's weight not being updated every six months, 2) subsequential pregnancy after dropping out of the WIC program, 3) mother's not being aware of their current weight prior to pregnancy, 4) the majority of weight measurements were done off-site, and 5) accuracy of the obtained measurements.

In addition, WIC recorded data on the children may have been affected by: 1) accuracy of weight measurements, 2) weight measurements being obtained off-site, and 3) child's cooperation in the measurement process. Most other studies have concentrated on the relationship between birth weight and the mother's weight or birth weight and later childhood growth. In this study, as in the of Ginsberg-Fellner, et. al. (1981) study, the writer focused on the weight of children at three different age levels from 3 to 5 years. The results may have been influenced by the age range distribution. The majority of the pre-schoolers were three years of age. Selection of a single age group could have influenced the correlation.

The correlation of mother's age upon delivery and the weight of the offspring was very low. The WIC records showed the most frequent mother's age at delivery was eighteen and twenty years of age. In public health at eighteen years of age, a mother is no longer considered an adolescent or a minor. The first time mother requires an intensive amount of teaching support by health care professional. If the mother has a limited amount of education, then the ability to comprehend the information given regarding infant feeding, parenting skills and basic baby care may be overwhelming. As a result the young mother may misinterpret the behavior of the child. She may think that every cry means the infant is hungry and, therefore, overfeeding may occur.

Findings on the weight of the child and the height of the child has a very substantial correlation. A degree of error could occur in regards to the accuracy of measurements. Weights and heights should be done more than once. Children are generally weighed wearing their clothing. If the children feel uncomfortable undressing down to underclothing at least two pounds should be subtracted for weight of clothing. Shoes should be removed when obtaining height.

The height of mother and height of child also had a low correlation. Height is determined by genetics, environmental and nutritional factors. It is a common practice for health care professionals to assume that most mothers are aware of their height. Typically, this measurement is not performed by a health care professional, but requested from the patient. However, this could cause a degree of error because some women used their heights from driver's license or state identification criteria which was issued at an early age when most females are still growing.

The findings of this study could also have been influenced by the accuracy of the medical records, parental training skills, and socioeconomic status of the mothers. The factors of physical activity, chronic disease state, regular visits to the physician, parental genealogical history were not controlled.

Recommendations

The relative significant of the findings and the low correlations lead the researcher to recommend that further research be done to determine if the following factors influence the weight of the mother and the weight of the offspring.

1. Parental genealogical medical history should be documented on both parents.

2. The level of obesity among sibling should be monitored on a regular basis.

3. The physical activity of family members especially of the offspring should be monitored.

4. Screening for obesity of the offspring should be monitored as early as two years when obesity has been documented in parental medical history.

5. The relationship family-income and social class to childhood obesity should be studied.

6. Studies need to be done on the potential environmental and

behavioral risk factors of obesity in African- Americans women and children.

7. Communities need to be made aware of weight reduction programs.

8. Mother's attitudes toward obesity in general, and childrens' obesity, in particular, should be examined and monitored.

9. Parents and children must be provided access to health care professional who specialize in the treatment of obesity.

10. Access to transportation should be provided to weight reduction programs for obese mothers and children.

11. Research needs to be done on the eating habits of obese families with obese children.

12. Early intervention program need to be established and monitored on childhood obesity.

13. The accuracy of charted measurements needs to improved.

14. Intervention programs need to be implemented on the prevention obesity of early childhood obesity.

15. Assessment programs need to be implemented to address postpartum obesity.

16. Research needs to be done on the effects of short interconceptual pregnancy on the weight of women.

17. Further research should be conducted on the effect of substance abuse on the eating habits of women and children.

18. Studies should be done on the effects of alcohol and drug abuse by mothers on their offsprings' weight and health.

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